Purchasing management: 'We must go further'

Exclusive survey

A significant gap is developing between purchasing departments' current efforts and potential improvements in purchasing's performance, according to the second annual survey of electric utility purchasing managers by *EL&P* and Richard Metzler and Associates (RM&A).

More than 80 percent of respondents believe that basic directions and strategies should be rethought. Three specific strategies are emerging:

1. Shift from techniques and process-related programs to an emphasis on end results (42 percent of respondents).
2. Streamline and improve organizational effectiveness (35 percent of respondents).
3. Increase operational integration inside and outside the utility (23 percent of respondents).

Respondents were purchasing managers representing all U.S. geographic regions; 26 percent of respondents were involved with power delivery purchasing, 28 percent with fossil, 16 percent nuclear, 18 percent with both nuclear and fossil, and 20 percent were involved in other types of purchasing. Nearly 40 detailed responses represent electric utilities with revenues from $100 million to $5.0 billion and an average of $1.9 billion.

Things to lose sleep over

Purchasing managers nationally presented a clear picture of three major concerns:

- Internal concerns.
- External concerns.
- Supplier relationships.

As outlined in table 1, purchasing management reports its three most important internal concerns are inventory control, lack of end-user planning, and systems/level of automation. Improved control over inventory is tied to tightening utility budgets, and driven in turn by an increasingly competitive energy market and/or continued regulatory scrutiny.

Lack of end-user planning, including outage planning, remains a chronic problem that affects inventory levels, lead times, costs, and quality. Purchasing's ability to manage costs and improve service to end users is hampered by aging systems that are less and less effective in serving the utility's evolving needs. Survey data reveal that the average age of an internally developed information system is eight years, and an externally developed system is almost four.

Purchasing's Most Important Internal Concerns (Table 1)

Issues	Respondents (%)
1. Inventory Control	25%
2. Lack of End-user Planning	14
3. Systems/Level of Automation	14
4. Staffing Levels	10
5. Span of Control	8
6. Insight into Corp Strategy	6
7. Budget	6
8. Organizational Structure	6

Source: EL&P/RM&A Survey

Table 2 defines purchasing's most significant external concerns. These are consistent with last year's survey results and reflect traditional purchasing-vendor issues.

Compared with last year's survey (*EL&P*, 9/90, p 19), this year's results indicate that supplier performance is the same or worse across four basic factors: order lead times and product quality have remained the same, prices have increased, and the level of vendor support has decreased. Profit problems in the supplier segment continue and basic service levels are deteriorating. As one respondent noted, suppliers provide "less support, have larger territories to cover, and carry smaller inventories."

Purchasing-supplier relationship

Many purchasing managers look back to a time when the utility business was simpler. One purchasing manager seemed to speak for all when he said "doing business should be fun again. The buyer and vendor shouldn't be making each other look bad."

The relationships between suppliers and purchasing departments have become more complex. As Table 3 shows, the 10 most important aspects of the purchaser-supplier relationship are both tangible and intangible.

One respondent noted that "this is a quantifiable relationship that is evaluated by the numbers. Low performance—we don't do business. However, the personal relationship I develop, trust, honesty, and a commitment to perform time and time again, is most important to me." It's interesting to note from the tables that partnering was near the bottom as a concern and as an important aspect of the relationship with suppliers.

Suppliers and buyers do not yet agree on the benefits each will receive from these "partnerships." The vendor sees it as a way of locking up requirements and a future stream of revenue. The buyer agrees only to the extent that alternative and competitive sources are unavailable. As a consequence, utilities are not yet realizing the types of benefits being gained from partnership in other industries.

Purchasing's Most Important External Concerns (Table 2)

Issues	Respondents (%)
1. Product Quality	39
2. Order Lead Times	19
3. Level of Support	11
4. Firm Pricing	10
5. # of Available Suppliers	9
6. Vendor Relations/ Partnering	5
7. Product Compatibility	3
8. International Suppliers	3

Source: EL&P/RM&A Survey

While the reasons are open to debate, in general, manufacturers have been more reliant upon lean inventories and line production than have regulated utilities and have benefitted more from "partnering." The nature of the utility grid and business traditionally grants more flexibility to compensate for a failed component and still produce and deliver power. Still, greater opportunities exist for utilities.

Current programs

Given these concerns, purchasing management has initiated a number of programs and techniques to improve its performance. These actions, outlined in Table 4, emphasize a basic programmatic approach to improving performance, examples being the pursuit of Electronic Data Interchange (EDI), quality programs, vendor partnering and formal vendor evaluation programs. These programs are the same as those identified in the previous annual *EL&P*/RM&A survey. The purpose of the programs is to address the primary concerns of purchasing management: quality, lead times and support levels.

Emerging strategies

The survey's final question asked, "Do you believe the goals and objectives of your organization should change in the future, and if so, how?"

More than 80 percent of survey respondents said the direction and strategies of the purchasing organization should be rethought. While Total Quality Management and other process-oriented programs are necessary and positive steps, they are not sufficient. Purchasing managers report that they must better manage their own organizations, and maximize contributions to the corporate bottom line. Three specific strategies emerged from their comments.

1. Shift from techniques and process-related programs to an emphasis on end results (42 percent of respondents). The advent of programs and initiatives such as total quality programs, formal vendor-utility partnerships, and other vendor evaluation programs have focused substantial attention on process. Specifically, these programs are imposing a process overlay on purchasing departments that is diluting management attention and resources away from end results. Purchasing management reports that they must implement programs and develop systems that support and measure results versus process. While a process orientation is useful, organizational focus, including process, needs to remain fixed on improving departmental performance.

10 Most Important Aspects Purchasing-Supplier Relationship (Table 3)

Rank	Respondents (%)
1. Quality	19
2. Trust	14
3. Reliability/Performance	13
4. Cost/Pricing	13
5. Communication	12
6. Service Level	9
7. Honesty	8
8. Responsiveness	6
9. Partnering	4
10. New Designs	2

Source: EL&P/RM&A Survey

2. Streamline and improve organizational effectiveness (35 percent of respondents). Process speed, process versatility, increased information flow, full utilization of available technology and other resources, and greater creativity will be key considerations of organizational design and personnel selection.

While these characteristics are not new, they reveal a dissatisfaction with how a purchasing department functions and responds. Further organizational modification should position the purchasing organization to better respond to its changing environment, including the management of its internal and external pressures.

3. Increase the level of backward and forward operational integration; that is, improve relationships within the utility and with vendors (23 percent of respondents). Implementing an effective mechanism to link up with purchasing's internal and external constituents continues to be an issue. A cornerstone of any mechanism is to ensure common goals with these entities.

Internally, purchasing must work with engineering, end users, and operations planning to build trust among departments, actively participate in advance joint planning, and foster an understanding of total acquisition cost and the impact on the corporation.

Purchasing Actions in 1991 Ranked by Importance (Table 4)

1. Product Standardization
2. Cost Containment
3. Greater Use of Technology (EDI)
4. Implementation of Quality Program
5. Organization Change
6. Vendor Partnering
7. Increased Safety Stock
8. Formal Vendor Evaluation
9. Length/Scope of Vendor Contract

Source: EL&P/RM&A Survey

Externally, purchasing must work with multiple supplier departments, not only sales but also engineering and distribution, to accomplish much of what is required with purchasing's internal constituents. Specifically, purchasing must build an environment of trust, participate in product planning sessions, recognize the total cost of acquisition, and share in the successes and failures of the relationship.

Looking ahead

In the future, purchasing management should continue to strive to broadcast its value internally and to develop an effective relationship with key suppliers, formal or informal, on the basis of shared success and failure, the survey results suggest.

In the past, the state of the electric utility industry did not necessitate an aggressive focus on cost containment. Regulatory action was deliberate and predictable, utility costs were passed through to ratepayers with little opposition, and the supplier industry thrived in the wake of a vibrant economy and consistently healthy load growth. As a result, the purchasing department's role as a critical contributor to the health of utility operations was not recognized and perhaps was unneeded.

However, in today's environment of increasing competition, continued regulatory scrutiny, internal pressures on cost, and shrinking supplier markets, a different focus on purchasing is required. Leading utilities are beginning to recognize that 25 to 40 percent of a utility's total cash flow passes through the purchasing and contracts organizations. The potential impact of a well-organized purchasing department is beginning to be realized. Forward-looking organizations will maximize this strategic component of a utility's cost structure by assessing the effectiveness of their own purchasing programs and by pursuing the changes in purchasing strategies outlined above.

Richard J. Metzler, James R. Blomberg and Kathryn Ball of RM&A contributed to this article.

Underground Systems Inc. acquires Nitech

MILFORD, CT—Nitech Inc. has been acquired by Underground Systems Inc. (USi) of Armonk, NY. The price was not disclosed.

The acquisition includes the operating assets and ongoing business related to the Power-Donut technology and other technologies related to direct electrical measurements from high-voltage power facilities.

Nitech's new Electran product is used for substation instrumentation application. By measuring high-voltage quantities without the need for conventional dc transducers or meters, energy management and SCADA systems may be expanded to older or smaller substations.

Nitech was founded in 1985 as a joint venture between Niagara Mohawk Power Corp. and an engineering/design firm. It will continue operations at its Milford, CT, location.

USi is a privately owned corporation providing high-technology engineering services and state-of-the-art transmission/distribution monitoring equipment to electric utilities.

HENRY STEIN, Senior Editor-Generation

Clean Coal awards to work in three different areas

WASHINGTON—In its fourth round awards, on Sept. 12, the Department of Energy selected nine new Clean Coal Technology (CCT) demonstration projects with a combined value of $1.5 billion. DOE will co-fund the projects with both private companies and state governments.

Changes, but DOE is pleased

The total federal assistance sought exceeded the $568 million DOE allotted for Round IV, so the department will negotiate changes in some of the projects. The nine new CCT projects joined 33 others selected in the previous three rounds, which brought the total combined government-industry investment in the program to $4.6 billion.

Declared Secretary of Energy James D. Watkins, "Today's [Sept. 12] action moves us closer to our goal of having in place a full complement of 'showcase' demonstration plants that I believe represent the future new look of the nation's coal-fired power industry." He went on, "Many of the technologies virtually eliminate the major pollutants commonly associate with acid rain, and several offer the dual benefits of superior environmental performance coupled with more-efficient, lower-cost power generation."

Current plans call for a fifth round to be held by March 1, 1992.

IGCC projects

The nine new projects are located in eight states. In Rounds 1-4, CCT will be sponsoring 42 ventures in 22 states. Round IV awards include:

- TAMCO Power Partners, a partnership of Tampella Power Corp. and Coastal Power Production Co., will conduct an IGCC project at a new power plant to be built at a coal mine near Coeburn, VA. The integrated-gasification combined-cycle (IGCC) process will produce 107 MW, while demonstrating improved coal-to-power efficiencies and reduced costs compared to commercially available systems. It also will reduce SO_2 and NOx emissions "significantly."

Other participants will be Stone & Webster Engineering and the Institute of Gas Technology.

- Sierra Pacific Power Co. (SPPC) proposes an 80-MW IGCC plant in western Nevada through a contract with Foster Wheeler USA Corp. The MW Kellogg Co. will be the subcontractor providing the design for the KRW fluidized-bed gasification process.

The project is to demonstrate that IGCC plants can have capital costs and thermal efficiencies that will reduce electricity costs below those of conventional technologies. It also is to show the effectiveness of hot-gas cleanup on low-sulfur western coals.

- Wabash River Coal Gasification Repowering Project Joint Venture, a joint undertaking of Destec Energy Inc. and PSI Energy Inc., will use a nominal 265-MW IGCC power plant to repower one of six units at PSI's Wabash River Generating Station in West Terre Haute, IN. The objective is to show that a commercial-scale IGCC system can be economically and environmentally effective for

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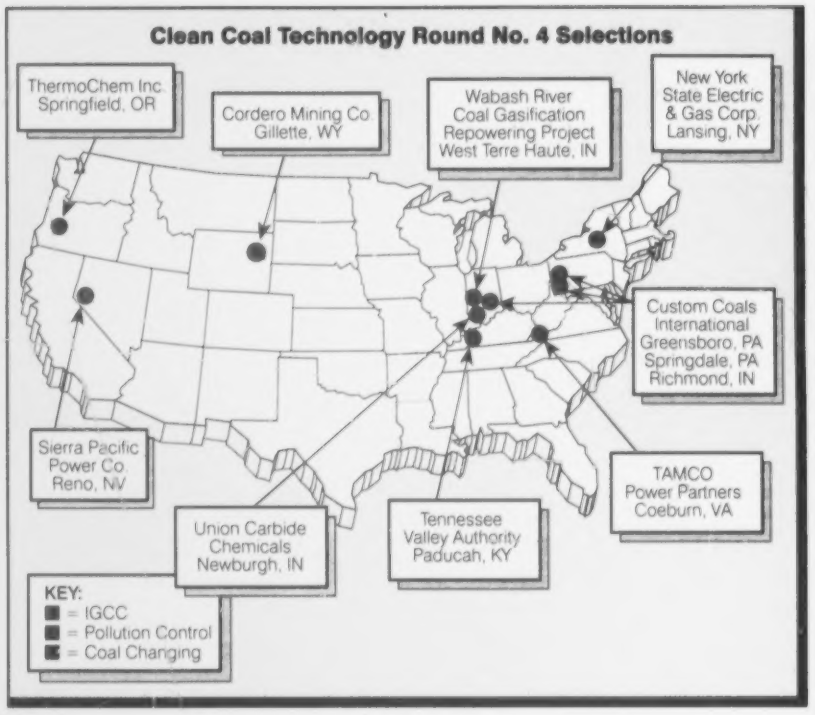

Bailly Station is moving toward recovery

HAMMOND, IN—Work continues at a careful pace at the Northern Indiana Public Service Co. Bailly Generating Station after an accident damaged and shut down two units there, and slowed construction of a scrubber.

As of late September, results of an investigation and cost estimates for damage had not been completed.

Pipes collapse

Bailly Station was shut down July 2 when the facility's two main underground circulating water pipes collapsed. The collapse created a ditch 150-yd long, 40-yd wide and 25-ft deep.

NIPSCO President Gary Neale said "...both the intake and discharge circulating water pipes have collapsed. There was structural damage to auxiliary buildings outside the main generating station."

Structures damaged included the

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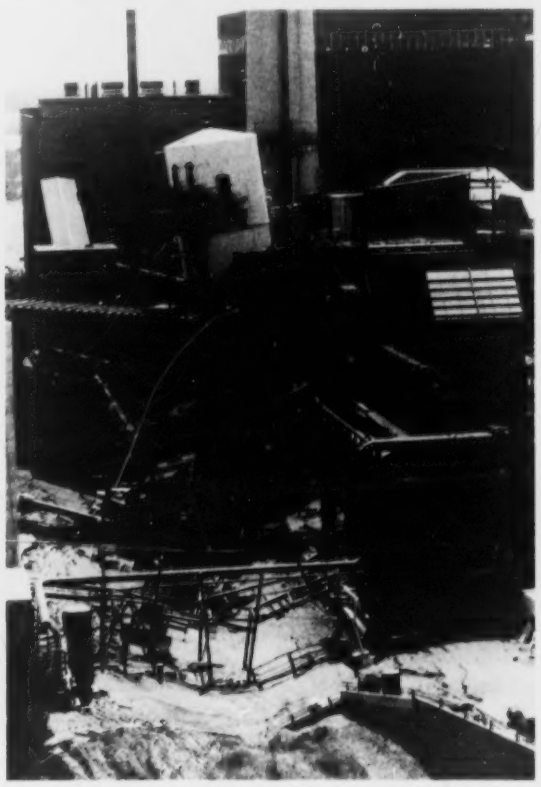
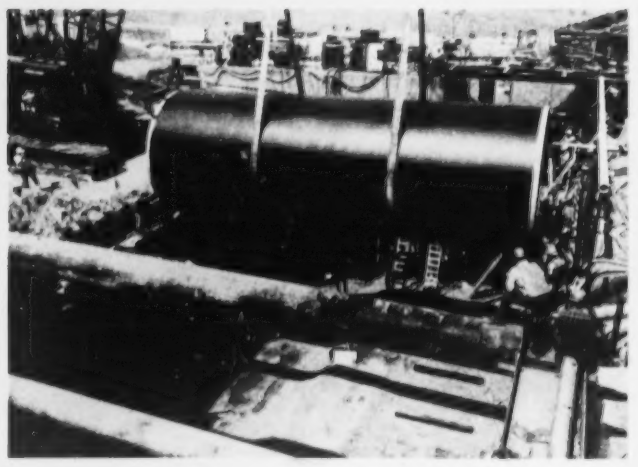


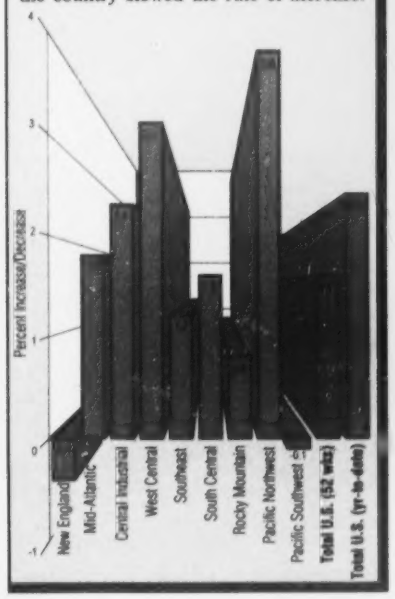


The accident at NIPSCO's Bailly Station created a 150-yd ditch (above). Flyash silo in background tilted about 20°, and the overhead ductwork severed. Closeup (above right) shows some of the construction equipment and vehicles that slid into the ditch after the station's water pipes collapsed. Crane (below right) lowers a section of new 1-in.-thick, rolled-and-welded water pipes into position.

ELECTRIC OUTPUT

Some Growth Slowed

Net electric output from the Mainland U.S. electric utility industry continued its gradual increase for the 52 weeks ending Sept. 21, as reported by Edison Electric Institute. Mild weather throughout most of the country slowed the rate of increase.



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VOICE OF THE ELECTRIC UTILITY INDUSTRY

ComEd strikes deal, awaits franchise vote

CHICAGO—Commonwealth Edison Co. hopes to sign a new 29-year Chicago franchise by year end. CECo and the city's administration forged an agreement Oct. 22, but a series of 10 public hearings were scheduled prior to a city council vote.

"As with any negotiation, you don't come away from the table with everything you want. But this is a good agreement for the people of Chicago," said Mayor Richard M. Daley. "It provides customers with the prospect of greatly improved service, opportunities to cut their bills through conservation measures and a greater level of accountability on the part of Commonwealth Edison."

In a companion agreement to the franchise, CECo promised to budget $1 billion for improvements to the power delivery system over the next 10 years and to review and upgrade fire-protection standards, if needed.

Reliability of service became an issue during negotiations after two highly controversial substation fires in 1990. CECo increased 1990 power-delivery spending by 10 percent to $370 million (more than 60% over 1988 spending).

CECo's Chairman James J. O'Connor was pleased at the city's positive view. "We pledge to do what is necessary to keep earning that trust and to maintain the level of service reliability to which Chicagoans have grown accustomed over the past century."

In part, the agreement also would:

- Keep the franchise fee at 4 percent of revenues, but pay monthly to make it consistent with compensation provided to communities outside Chicago (which receive free electric service for municipal buildings).
- Retain the city's acquisition option, undergrounding provision, and Equal Employment Opportunity and Affirmative Action guidelines.
- Require CECo to spend $25-50 million on demand-side-management programs and energy conservation measures over the next five years, record and report outages to the city, and promise to reexamine the residential rate structure, especially for low-usage customers.
- Confirm, with the city, that ultimate rates are determined by the Illinois Commerce Commission.

CECo also would agree to a number of technological upgrades to improve reliability, including computerized outage mapping and distribution automation, and hurrying progress on a computerized transmission monitoring system.

In 1990, CECo and the city had agreed to extend Chicago's 41-year franchise agreement by one year until a new deal could be reached.

In similar news, the utility agreed in September to the major terms for a model franchise that will be offered to each of the nearly 400 municipalities CECo serves outside Chicago.

Settling major franchise agreements would ease a long uncertainty about the company's financial stability. CECo had continuing difficulties getting the latest of its nuclear plants into rates. CECo has 12 nuclear units, the most of any U.S. utility. The plants generate about 80 percent of the electric power used by 3.1-million customers in Northern Illinois.

LATE NEWS

Commercial nuclear fusion power moved closer to reality on Nov. 9 when the British Joint European Torus produced 1.5-2.0 MW of power in a pulse lasting for 2 sec. It was the longest sustained reaction to date and the first to add tritium to the deuterium "fuel." However, the experimenters said commercial fusion is many years off and depends on substantial advances beyond this success. See *EL&P*, 1/92.

Senate's vote to block consideration of its comprehensive energy bill (S.1220) "may end up costing us 300,000 jobs and add billions to our trade deficit," said Secretary of Energy James D. Watkins. "This country desperately needs a national energy plan." The president, the private sector and the American people can do parts of the job. "But we are never going to get a comprehensive energy policy without comprehensive energy legislation," he said. Hearings on House energy bills continue.

EPA proposes four rules containing the core acid-rain requirements in the Clean Air Act Amendments of '90, as expected: Permits (40 CFR Part-72), Allowance System (-73), Continuous Emission Monitoring (-75) and Excess Emissions (-77).

Electric vehicles received a boost as DOE joins Chrysler, Ford, GM and EPRI in the U.S. Advance Battery Consortium.

Sexual harrassment, p. 19.
Guide to Power-Gen '91, p. 23.

Former managing editor becomes new *EL&P* leader

Chief editor Lincicome retires after 34 years

BARRINGTON, IL—Robert W. Smock has been named to head up the *Electric Light & Power* editorial program, succeeding *EL&P*'s editor-in-chief, Robert A. Lincicome, who retires on Dec. 16. (See p.4)

Smock will become editorial director of *EL&P* and its sister publication *Power Engineering*, where he has been editor since 1986.

Lincicome retires from *EL&P* after 34 years, the last 22 as editor-in-chief. He applauded the selection of Smock as his successor, observing that "Bob is uniquely qualified to lead *EL&P* into the next century. He knows the indus-

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Oakland PG&E fires cost more than $10 M

OAKLAND, CA—Pacific Gas & Electric Co. crews worked with firefighters during the devasting Oakland-area blaze, turning off electric and gas service and running new lines to key pumping stations after flames cut power.

At times, the wind-swept blaze was more than a 2000°F, 100-feet-high, 60-mph wave of fire. Underground electric facilities fused. PG&E's preliminary damage estimates exceeded $10 million.

From PG&E accounts, Sunday Oct. 20:

Early afternoon: 300 workers are in the fire area travelling with fire crews to de-energize lines, turn off gas at individual homes. One crew nearly lost when flames turn.

Mid-afternoon: East Bay MUD [Municipal Utility District] reports four key pumping stations have lost power, possibly compromising firefighting. PG&E crews working in sight of flames, run new line up backside of mountain to key Golden Gate pumphouse. Power restored by 6 p.m., three hours later. Service restored to second

Continued on page 9

Photo by PG&E's Alan Heald

Fireplaces stand like tombstones as PG&E crews work in the blue haze and ashes of the Oakland blaze, the most destructive fire of its kind in state history. Losses included 17.5 miles of distribution line and 225 transformers. PG&E crews removed 220 tons of debris.

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News Briefs

JILL MINNER, Special Projects Editor

DOE sells pollution control technique to private firm

The Department of Energy said it has sold the rights to a pollution control technique, developed at its Pittsburgh Energy Technology Center, to NOXSO Corp. for $10,000.

According to DOE, the technology significantly increases destruction of nitrogen oxides, a pollutant known to contribute to acid rain.

DOE said the technique could play an important role in meeting the new requirements of the federal Clean Air Act, by enhancing the effectiveness of an advanced scrubbing system invented by NOXSO. The scrubbing system is scheduled for demonstration in DOE's multibillion dollar Clean Coal Technology Program in 1994.

"As we stated in the National Energy Strategy, the success of every research project in our portfolio ultimately depends on transferring results out of the laboratory and into commercial use. This technology transfer agreement is a textbook example of how federal scientists can work with the private sector to meet a market need," said Linda G. Stuntz, DOE acting Assistant Secretary for Fossil Energy.

Boston Edison forms energy advisory panel

Boston Edison Co. President and CEO Bernie Reznicek announced that the utility has established an Energy Advisory Panel to provide the utility with "candid, honest evaluations of our programs, policies and procedures as they affect customers and the market."

The panel, made up of nine commercial and industrial business leaders, will meet quarterly to discuss any energy-related concerns and opportunities that might impact area businesses. "It's designed as a forum for area businesses to voice their concerns to us, and for us to plug those concerns into our plans," explained Reznicek.

Topics scheduled for the panel's first meeting in February 1992, include the region's economic development, the cost of electricity, environmental concerns and actions, competition for energy customers, nuclear power and more.

NSWMA companies to form independent assn.

Member companies of the Institute of Resource Recovery (IRR) within the National Solid Waste Management Association (NSWMA) have announced their plans to withdraw from IRR in order to form an independent association.

According to NSWMA, the companies plan to withdraw on Jan. 1, 1992, in order to form an association that will principally advocate the role of waste-to-energy in public solid waste management policy.

The companies involved include: ABB Resource Recovery Systems, American Ref-Fuel, Foster Wheeler, Ogden Martin Systems, Reading Energy, Westinghouse and Wheelabrator Technologies.

Support growing for nuclear energy use: poll

The U.S. Council for Energy Awareness reports that a new Gallup poll found 73 percent of Americans believe nuclear energy should play an important role in meeting the nation's energy needs. A Cambridge Reports poll, taken in February 1990, showed 65 percent of Americans said nuclear energy should play an important role.

The Gallup poll also revealed that almost two-thirds of Americans are now aware that using nuclear energy to generate electricity cuts greenhouse gas emissions by displacing fossil fuel generation.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Alabama Power Co.
A $25,000 civil penalty for alleged violation of NRC requirements at the Farley nuclear power plant. NRC said the problem, allegedly caused by ineffective procedural controls and communications, involved a valve which had not been properly closed after testing was completed on a reactor in hot standby.

Duquesne Light Co.
A $25,000 fine for an alleged violation at Unit 1 of the Beaver Valley Power Station involving a pipe weld that had been omitted from the unit's drawings. The NRC staff alleges that prompt action was not adequately taken to identify and correct the problem.

Northeast Nuclear Energy Co.
A $50,000 fine for allegedly failing to identify and correct a problem at its Millstone Unit 3 nuclear power station. An NRC inspection found that employees did not aggressively determine the cause of and correct a reduction in water flow through the service water system caused by a buildup of mussels in the piping.

Virginia Power
A $125,000 civil penalty for alleged violation of NRC requirements at the Surry Power Station. The violation, identified during an NRC inspection review, involved full operability of certain safety systems.

FERC OKs agreements for Georgia Power and Oglethorpe Power

Oglethorpe Power Corp. and Georgia Power Co. have received approval from the Federal Energy Regulatory Commission on operating agreements which were approved by the Rural Electrification Administration in August. Under the agreements, Oglethorpe Power may buy and sell bulk power and establish new terms for the purchase of power from Georgia Power.

According to Tom Siegrist, Oglethorpe Power vice president-system operations, the agreements confirm the utility's right to use the state's Integrated Transmission System to purchase power from and sell power to other utilities and facilitate Oglethorpe's participation in the national bulk market.

"The agreements place us in a better position to secure power for our Member Systems in the face of an increasingly competitive utility environment," Siegrist stated.

New name for PG&E-Bechtel Generating Co.

PG&E-Bechtel Generating Co. announced that it is changing its name to U.S. Generating Co. "U.S. Generating Co., which is a partnership of Pacific Gas and Electric Co. and Bechtel Group, Inc., has now established itself as a nationally recognized and leading developer of cogeneration and independent power projects. It is important to more firmly establish the partnership's unique identity and to emphasize its nationwide scope in the business of generating and selling electricity on a wholesale basis. We think the name U.S. Generating Co. accomplishes both of these objectives," explained Joseph P. Kearney, president and chief executive officer of the firm.

UFI benefits from legislation; helps utilities comply with Clean Air Act

Utility Fuels Inc. (UFI), Houston Industries' coal supply and handling subsidiary, recently expanded its railcar fleet to help utilities and other companies comply with the Clean Air Act, and at the same time increase its own profits.

"As more utilities work to comply with clean air legislation by 1995 and 2000, you'll see more utilities switching to Western coals," stated Lawrence J. Rogers, UFI vice president of business development. "We're working to be in a position to help them transport the 'clean' coal they need, while earning a reasonable profit for UFI."

UFI currently supplies 17 million tons of coal and lignite annually to six of Houston Lighting & Power Co.'s generating units. UFI has also entered into an agreement with Wisconsin Public Service Corp. to provide the utility with railcars to haul low-sulfur coal from Wyoming to Wisconsin.

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IEEE splits RF guidelines into two exposure levels

1st-time move eases some exposure standards; study continues on more controversial EMF

Mark T. Hoske
News Editor

An Institute of Electrical and Electronics Engineers' committee has split its radio-frequency (RF) exposure standards recently, essentially into two site-dependent levels—"controlled" and "uncontrolled" exposures.

The move, which updates the 1982 American National Standards Institute RF exposure guidelines, eases some exposure standards and tightens others.

The recommended changes in guidelines came from the committee's review of 321 papers. Researchers also included "important improvements in rules for valid measurement of electric and magnetic fields" and expanded rules for relaxing the exposure limits for partial body exposure.

Also more controversial 'EMF'

The general term electromagnetic fields "EMF" includes both electric and magnetic fields. The present scope of work includes developing standards in the RF range of 3 kHz to 300 GHz. Work by another subgroup is looking at fields under 3 kHz, which would include some of the very controversial EMF exposures about which the public has increasing concerns.

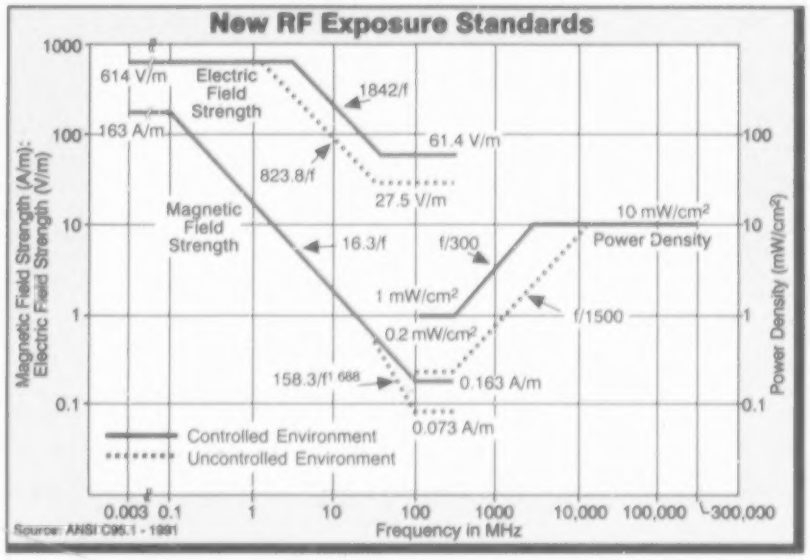
The committee involved in these efforts is the Standards Coordinating Committee 28 (SCC-28), under the IEEE Standards Board.

SCC-28 continues study for setting future exposure guidelines. As the sole sponsor for setting EMF exposure standards, IEEF has asked outside organizations for funding to continue, and perhaps expand, the complex effort to produce guidelines and conduct research where lacking.

The latest guidelines

Eleanor R. Adair, SCC-28 member, and a researcher at the John B. Pierce Laboratory in New Haven, CT, recently explained the committee's work on the new standards.

After considerable debate, the committee agreed, for the first time, to split the standards into "uncontrolled" and "controlled" exposures. Adair said the committee felt that the labels "public" and "occupational" are highly charged and political, and so avoided them. Adair explained that it would be wrong to equate controlled and uncontrolled exposures with occupational and public exposures because the former is site-specific, while the later is population dependent.



The latest guidelines were based on exposure levels far below what caused lab-animal behavior disruption. "Behavior disruption is the smallest observed effect that may indicate a hazard for people. We agreed this was a good basis for setting the new guidelines," said Adair.

Adair gave a work-equivalent analogy: the behavior disruption minimum of 4W/kg is similar to light housework (or driving a truck). A safety factor of 10 was added to get the controlled environment exposure (0.4 W/kg) equivalent to putting on a light sweater. For uncontrolled environments, an additional safety factor of five was added to the 0.4W/kg exposure.

Recommended exposure limits vary for each category, but are generally less for uncontrolled exposures.

Within the range of resonant frequency for humans, the new standard for controlled exposure is identical to the 1982 standard. In the higher frequencies, the standards are relaxed, Adair noted. (See related story.)

The split in exposure guidelines and additional issues has contributed to extended debate, but the resulting guidelines truly reflect current knowledge, Adair added.

Any comments about the revised RF standard may be directed to IEEE, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

Sources involved in the effort below the RF range said a lot of low-quality EMF research and irresponsible reporting of some findings has caused much of the public's concern on the issue. This concern, coupled with lack of federal EMF guidelines, may give Congress an excuse to step in, others suggested. EMF was not in energy legislation under consideration as of early November.

Choosing research to support possible standards on the lower frequencies, or extra-low frequencies (ELF) is no easy task, explained SCC-28 member Thomas F. Budinger, of Lawrence Berkeley Laboratory.

Last year, SCC-28 formed a subcommittee which seeks to set safe guidelines for 0-3 kHz extra-low frequency (ELF) exposures. Sixty persons, including biologists, physicists, engineers and medical scientists, are now members of the subcommittee.

"If you could realize how bad almost all of these [ELF] epidemiological studies are," said Budinger, "you'd wonder if we weren't being led down the wrong path."

What is valid research?

"I can't say much about the [usefulness of most] data." Too many studies use "soft data to show trends, but such conclusions are not statistically correct," explained Budinger. The numbers of observations need to be much greater before a study's conclusion is reliable. A study with an inadequate statistical base is not hard data and not valid to report as a "trend."

For example, a reliable study of 1000 people would have to show a 300-percent increase in cancer over incidence in the control group. An increase in cancer incidence of 10, 50, or even 200 percent wouldn't be statistically significant, he noted. If studying a single type of cancer, within the same example, a much greater incidence than a tripling would be required to show a valid cause and effect, Budinger explained.

Budinger heavily criticized researchers and others whose data reporting causes panic among the public and is emphasized by the media.

"There's too much bad research, not enough good research and not enough research dollars," he lamented.

For research on guidelines on the full range of exposures, SCC-28 is sending a request for three-years of funding to organizations including the U.S. Department of Energy, the Air Force, Army, Navy, industry, Green Peace, state governments, and the U.S. Public Health Service.

No limits for public exposure

The U.S. government, Budinger said, doesn't regulate EMF exposures, despite seemingly high exposures in some public places. In the Washington, DC, subway system, Budinger cited static magnetic fields of 3-21 gauss near the door of a rail car, and as much as 60 gauss on the floor, under certain conditions. Sixty gauss is enough to activate or deactivate the reed switch of a pacemaker, he noted.

David Janes, recently retired from the Environmental Protection Agency, also expressed concern about the lack of guidance. "There are no federal occupational or health standards for electric

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Illinois utility wins insurance coverage for coal-gas cleanup

Central Illinois Public Service Co. (CIPS) claimed victory in the first jury trial verdict concerning insurance liability for a former coal-gas manufacturing site.

At least seven similar suits are pending around the United States, and more than 1500 similar sites could require cleanup, according to a law firm representing CIPSCO Inc., the utility's holding company.

The 100-year-old Taylorville, IL, site turned into a Superfund cleanup project, where cleanup costs may total more than 812 million, according to CIPS. The Springfield, IL-based electric and gas utility has spent more than 87 million at the site through November 1991, working with the Illinois Environmental Protection Agency (IEPA).

CIPSCO has identified a total of 12 sites, owned by the utility, or predecessor companies (*EL&P*, 12/87, p.15).

The defendent, the American Empire Surplus Lines Insurance Co., may have to pay CIPS for investigation and cleanup costs at the former site under a 815-million environmental impairment liability policy written in 1983 and later renewed.

Prime arguments

A Cook County, IL, jury found that CIPS had neither expected nor intended contaminants to be released from its former manufactured gas plant in Taylorville, IL. The jury also found that CIPS did not knowingly discharge contaminated water resulting from the gas manufacturing process directly onto the ground. These were prime arguments for the defense denying coverage under the environmental policy, CIPS' attorneys noted.

"The court is expected to further clarify the question of whether the utility also is entitled to coverage under its comprehensive general-liability policies," CIPS said. As of early November,

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IEEE committee sets standards

The IEEE Standards Coordinating Committee 28 (SCM-28) is responsible for revising the present radio-frequency (RF) standards.

The scope includes: Developing standards for the safe use of electromagnetic energy relative to the potential hazards of exposure of man, volatile materials and explosive devices to such energy in the range of 0-300 GHz. It is not intended to include infrared, visible, ultraviolet or ionizing radiation.

SCC-28's six subcommittees have issued three standards, one guide and one recommended practice.

- **C95.1-1982, Human exposure to radio-frequency EMF, 300 kHz to 100 Ghz.**
- **C95.2-1981, Frequency radiation hazard warning symbol (reaffirmed in 1989).**
- **C95.3-1973, Techniques and instrumentation for measuring EMF at microwave frequencies (reaffirmed in 1979).**
- **C95.4-1978, Guide for preventing radiation hazards when using electric blasting caps.**
- **C95.5-1981, Recommended practice for measuring EMF, RF and microwave fields.**

Revisions of C.95.1-1982 include expanding the frequency range, limits on induced body current to prevent RF shock or burn, relaxing exposure limits to magnetic fields at low frequencies, and relaxing exposures to high frequencies that are compatible at 300 GHz with existing infrared maximum-permissible-exposure (MPE) limits.

Compliance with the MPE in controlled environments can be achieved normally by wearing protective gloves, staying clear of metallic objects and training personnel. Evaluating the magnitude of the induced currents will normally require a direct measurement.

The range of "safe" exposure levels is shown in the graphic.

—Wayne Beaty
Senior Editor-Power Delivery